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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/750,040	12/30/2003	Andrew S. Grover	42.P18166	9171

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EXAMINER

LI, ZHUO H

ART UNIT PAPER NUMBER

2185

DATE MAILED: 01/17/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

10/750,040

Applicant(s)

GROVER ET AL.

Examiner

Zhuo H. Li

Art Unit

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 30 December 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-21 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1,2,7-9 and 12-16 is/are rejected.
- 7) ☒ Claim(s) 3-6, 10-11, 17-21 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 30 December 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_

## **DETAILED ACTION**

### ***Specification***

1. The disclosure is objected to because of the following informalities:

Page 2, under Notice of Related Applications, Applicants or their representatives are urged to provide the updated co-related applications' information.

Appropriate correction is required.

### ***Claim Objections***

2. Claims 1, 8 and 15 are objected to because of the following informalities:

Claims 1, 8, and 15, each recites the term "the a system" should be "a system".

Appropriate correction is required.

### ***Claim Rejections - 35 USC § 112***

3. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

4. Claim 7 and 12-14 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claims 7 and 14 each recites the limitation "the second level" in line 1. There is insufficient antecedent basis for this limitation in the claim.

Claim 12 recites the limitation "the first level" in line 1. There is insufficient antecedent basis for this limitation in the claim.

***Claim Rejections - 35 USC § 103***

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

7. Claims 1, 8 and 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lin (US PAT. 6,052,789) in view of Friedman et al. (US PAT. 6,711,043 hereinafter Friedman).

Regarding claim 1, Lin discloses a method comprising determining a status, i.e., a normal mode or a suspend mode with condition or battery level based on the determination of a power monitor device, of a system, i.e., computer system (figure 1), setting an associative level of a memory unit, i.e., cache memory (col. 1 lines 19-29), of the system based on the status of the

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system, i.e., places a write-back cache memory into a write-through mode upon detection of a low-battery condition, wherein the secondary cache (102) is shut down when the system is in suspend mode with write-through cache mode (col. 4 lines 7-52). Lin differs from the claimed invention in not specifically teaches the cache memory unit is a non-volatile memory. However, Friedman discloses a three-dimensional nonvolatile memory cache (905, figure 9) comprising a dram buffer, i.e., first level cache (910, figure 9) and 3D nonvolatile buffer, i.e., second level cache (920, figure 9), wherein the three-dimensional nonvolatile memory cache is interconnected between the host (950, figure 9) and the disk drive (930, figure 9) to transferring data into/out from the disk drive (col. 8 lines 8-36). Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to modify the cache memory in the computer system of Lin is a non-volatile memory, as per teaching by the storage system of Friedman, because it increased capacity of the combined DRAM/nonvolatile memory, which it allows for larger and less frequent transfers to the disk drive, and improves system performance (col. 8 lines 34-36).

Regarding claims 8 and 15, the limitations of the claims are rejected as the same reasons set forth in claim 1.

8. Claims 1-2, 7-9, and 12-16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Mayo et al. (US PAT. 2004/0,230,848 hereinafter Mayo) in view of Sarkory (US PAT. 5,732,238).

Regarding claim 1, Mayo discloses a method comprising determining a status, i.e., either power reduction or remove power reduction (figure 2) of a system, i.e., data center (100, figure

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1), setting an associativity level of a memory unit, i.e., assess nodes (20-26, figure 1) as defined as cache memory [0014], of the system based on the status of the system (figure 2 and [0030] to [0034]. Mayo differs from the claimed invention in not specifically teaches the memory unit is a non-volatile memory unit. However, Sarkory discloses a data storage system (22, figure 2) comprising a disk platform (28, figure 2) intercepting access between a host computer (10, figure 2) and disk (16, figure 2), wherein the platform further comprising a set-associative non-volatile cache (95, figure 7) for storing most frequency access data (col. 11 line 30 through col. 12 line 17, and col. 13 line 32 through col. 14 line 21). Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to modify the cache memory unit in the data center of Mayo is a non-volatile memory, as per teaching of Sarkory, because it improves in simplicity and efficiency of operation, and minimize the number of data transfers required with the disk drive by using a non-volatile cache memory in the disk array system, which further reduces data access time in the disk system (col. 11, lines 3-28).

Regarding claim 2, Sarkory discloses the non-volatile memory unit is a cache, i.e., nonvolatile cache (96, figure 7) for a hard disk, i.e., disks (16, figure 2) of the system.

Regarding claim 7, the difference between Sarkory and the claims is the claims specifically recite the memory is a two-way associative cache. However, having variable way association does not have a disclosed purpose nor is this specifically way disclosed to overcome any deficiencies in the prior art. As such, the memory may have been any way of association cache. In addition, since Sarkory a four-way association non-volatile cache (figure 7), the ordinary artisan would realize a possible way of association cache selection as the current technology would warrant. Accordingly, it would have been an obvious matter of design choice

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to utilize the system of Sarkory wherein the non-volatile cache is four way association cache, as disclosed supra, since applicant has not disclosed that 2 way set associative cache, as opposed to other sizes, over comes a deficiency in the prior art or is for any stated purpose.

Regarding claim 8, the limitations of the claim are rejected as the same reasons set forth in claim 1.

Regarding claim 9, the limitations of the claim are rejected as the same reasons set forth in claim 2.

Regarding claims 12 and 14, the limitations of the claims are rejected as the same reasons set forth in claim 7.

Regarding claim 13, the second level cache is a four way or less set associative cache (figure 7).

Regarding claim 15, the limitations of the claim are rejected as the same reasons set forth in claim 1.

Regarding claim 16, the limitations of the claim are rejected as the same reasons set forth in claim 2.

#### ***Allowable Subject Matter***

9. Claims 3-6, 10-11, and 16-21 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

#### ***Conclusion***

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10. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Naji (US PAT. 6,452,823) discloses non-volatile magnetic cache memory and method of use wherein the non-volatile cache memory is set associative cache (abstract).

Jones et al. (US PAT. 5,537,360) discloses programmable power supply systems and methods providing a write protected memory having multiple interface capability (abstract).

Coulson (US PAT. 6,725,342) discloses nonvolatile mass storage cache coherency apparatus (abstract).

Takagi (US PAT. 6,131,147) discloses large capacity storage apparatus having storage cells, and accessor, a cache memory and a disc update section to set a number of frequently accessed storage media (abstract).

11. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Zhuo H. Li whose telephone number is 571-272-4183. The examiner can normally be reached on Tues - Fri 9:00am - 6:30pm and alternate Monday..

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Matthew Kim can be reached on 571-272-4182. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.



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12. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Zhuo H. Li



Patent Examiner

January 8, 2006



BEHZAD JAMES PEIKARI  
PRIMARY EXAMINER